Section 12 - Issues

The success of the Strategy will be perceived from two perspectives:

- **Classical**. A classical view deals with the mechanical aspects of deploying multiple pollutant sites, conducting meaningful network assessments, and promulgating regulations. The menu of training, pilot studies and resource recommendations speak directly to this perspective, and entail a plethora of administrative and technical challenges.

- **Value.** Perhaps a more important perspective is based on the level of value derived from the networks in terms of how air and environmental program policy is shaped and evaluated. In addressing this issue, the real success of the Strategy ultimately will require other important systems, and perhaps cultural modification upgrades that allow for a meaningful dialogue across data generators and data user communities.

12.1 Resource Issues.

12.1.1 Funding Stability for Monitoring Agencies and Tribes. The early Strategy discussions evoked a concern that any change in the networks, especially a thinning in monitoring sites, would result in a reduction in resources and serious degradation of monitoring agencies. These concerns were allayed by stressing the importance of retaining a stable funding base as a Strategy operating principle, and emphasizing a reallocation of skill mix (from labor to technical) and measurement approaches. Retaining a stable funding base for monitoring agencies and Tribes is of paramount importance among numerous resource concerns. Although many environmental assessment initiatives are based on short duration (1-3 years) efforts, effective ambient monitoring practice requires a longer, stable operation that can capture gradual signal changes in atmospheric concentrations over decades, while maintaining and enhancing a substantial infrastructure. Both the cost effectiveness and technical credibility of monitoring operations are compromised if operated in a cyclical ramp up, ramp down mode. A combined challenge will require balancing a desire for network responsiveness and flexibility with a stable underpinning.

12.1.2 NCore Level 1. There is no assurance that resources will be available to support advanced monitoring sites that provide a necessary technology transfer mechanism across the research and applications communities. The need for these sites has been emphasized throughout this document. Level 1 sites address a major weakness inherent in the national networks, which is the ability to capture adequate environmental measurements relevant to many evolving demands for air programs. Resources for Level 1 measurements should not be extracted from the existing STAG resource pool, acknowledging the need for stable agency and Tribal funding support.

12.2 Technical Issues

12.2.1 Measurements. Measurement challenges include the need to detect at very low concentration levels, and adopting to emerging pollutants, including precursors of concern.

First, as environmental progress continues to reduce atmospheric pollutant levels, the ability to adequately measure pollutants in very low concentration ranges is compromised by numerous factors mostly related to a spectrum of interferences that remain relatively stable (e.g., water vapor) and take on increasing importance with decreasing target compound concentrations. Even more challenging is the continued emergence of priority environmental pollutants. A few examples include fine particulate matter in the late 1990's, complex fractions and specific compounds associated with aerosol carbon, and numerous HAPs in the air toxics program which present somewhat profound measurement difficulties. Such a trend will continue over the foreseeable future. Gradually, traditional measurement approaches will undergo a major renovation that embraces emerging technologies that offer unlimited potential for environmental measurements. Such technologies include a range of semiconductor and microchip arrangements as well as nanotechnology.

12.2.2 Data Transmittal and Receiving. As more monitoring systems are converted to near continuous output, there needs to be a corresponding adoption of modern data handling systems. This issue has more to do with enabling agencies with appropriate guidance and resources to update data systems, as the technology is well evolved and available.

12.2.3 Standardization versus performance based standards. There are competing interests between the desire to embrace new technologies and the need for highly consistent measurement results. A performance based approach for methods approval and laboratory protocols is viewed as progressive and technology friendly. With adequate quality control measures, such an approach conceptually can provide technology incentives concurrently with meeting measurement quality objectives. Lacking adequate quality controls carries an attendant risk of producing measurement inconsistencies that compromise data interpretation and degrade temporal and spatial relationships. The Strategy largely advocates a performance based approach, particularly in regard to accommodating continuous particulate matter measurements. On the other hand, the Strategy implicitly relies on measurement consistency given the emphasis on synthesizing data from across disparate regions of the nation. This apparent paradox must be recognized to ensure that quality assurance systems are supported and operating as intended, as the reliance on performance based approaches is contingent upon an effective quality assurance program.

12.3 Administrative: Use of STAG Grants for National QA and Data Analysis

The implementation plan proposes a variety of funding shifts within the current program structure which require solutions based on some combination of needed consensus building or an explicit pool of new resources. The basic funding shifts of moving resources from filter based methods to continuous and trace gas measurements is relatively straightforward, although it requires a substantial communications and training effort. To a lesser degree, there is a concern about the ability to reach consensus on funding sources for national level quality assurance and data analysis, as described in Section 11. Over the course of deploying the $PM_{2.5}$ network, EPA and States and local agencies reached agreement on utilizing Section 103 STAG funds to support the $PM_{2.5}$ performance evaluation program (PEP), the national level quality assurance program enabling EPA to develop estimates of FRM performance. The rationale for using STAG funds was predicated on the understanding that such QA was a required element of the program, and it was more efficient to manage the program nationally through EPA headquarters. Although

consensus was reached on this approach, there always remained an underlying philosophical concern regarding whether such national QA should be funded through STAG or other EPA resources. From EPA's perspective, the STAG resources had a track record of stability that really is a prerequisite to maintain support for quality assurance efforts; whereas, EPA internal resources generally tend be volatile as they are subject to a spectrum of changing priorities. This issue is brought to attention here as the Strategy is recommending an increase in the STAG resources to support national level QA.

In addition to recommending a stable funding source for QA, the Strategy also recommends sectoring off STAG funds to support data analysis. This proposal follows the model established early in the air toxics monitoring program. The same issues discussed under QA apply here in an attempt to address an important gap in the monitoring programs. Assuming consensus is generated to dedicate STAG funds to data analysis, there remain a series of administrative questions regarding how such a program is carried out. Possible scenarios include establishing a management team of SLT/EPA members, charging EPA or a multi-state organization with this task with or without rotational turns.

12.4 Addressing Data Availability and Data Analysis Needs

The basic motivating reasons that initiated this Strategy remain as the principal obstacles to realizing the enormous potential of environmental data generated by the Nation's networks. Underlying all the rationale discussed in this introduction is a systematic problem of underutilization of environmental data. It is only through full data utilization that the concepts of meaningful network assessments and change, effective quality assurance insights, and integrated program relevancy can be realized. That is, retrospectively, if there existed a fully engaged and integrated data generating--data user--decision maker continuum network systems would be assessed and upgraded as a matter of daily routine.

The Strategy is taking positive steps to produce data more relevant to the user communities over the next few years. However, the Strategy lacks any definitive approach for promoting the use of its product, which requires an added level of commitment to data systems (e.g., transmission, archiving and distribution/access) and data analysis. This situation reflects a programmatic tendency toward compartmentalizing tasks. In this case, the Strategy development is led by the data collection/measurement component within EPA. The participation of partners in other functional areas (e.g., policy, data systems and analysis) has, understandably, been less of a priority. At this point, it is appropriate to acknowledge that substantial improvements need to be made to improve the linkages and effectiveness across numerous data systems that play various roles in handling air quality data with a commensurate education or communications effort that reaches the academic and private sector communities in addition to other government agencies typically supported by EPA.

12.4.1 Current Issues

There are two specific issues related to improving the accessibility to the data collected in the network. First, is reducing the time between pollution being in the air and EPA having information about it available for use. There are many reasons for delays in the "timeliness" of the data. First is the measurement method itself. Some samples can be taken in seconds, while

others take hours or days to collect. Then there is a delay in measurement of a sample. Continuous methods are virtually instantaneous while filter or canister methods must include time for transit to a lab, queuing for analysis, the measurement(s) made, and transit of the information back to the agency responsible for quality assurance and transmittal to EPA. Once the data is submitted to EPA, it is immediately available for use. Another reason for delays in the availability of the data is that regulations only require submission to EPA by 90 days after the calendar quarter in which the sample was collected. As work will expand to fill available time, EPA must revisit the deadline requirements or investigate incentives for beating the deadline. The near-real-time data submitted to EPA is done voluntarily and not required to meet the same quality requirements as the regulatory data. The issue of timely data is closely related to those of measurements and standardization versus performance based standards raised in Section 12.2.

The second issue related to data accessibility is ease of access. Two factors contribute to difficulties in our partners and customers easily getting the data they need. First, the network has many monitors operating on relatively fine time scales. This means there is a large volume of data available. Generally, technology outpaced data transfer and storage issues, so this does not present an insurmountable problem. The primary issue regarding data volume is cost. EPA has a finite amount of storage and networking capacity which must be shared and balanced among numerous users and demands. Redirecting resources can help with this issue, but shifting these resources would impact some other part of the program. The other ease of access factor is the complexity of the data and the myriad potential analytical uses for it. Data is collected using different methods, on different schedules, with different accuracy, and is affected by natural and anthropogenic events. EPA can make data available as it is reported or in a form processed to uniform time and exposure metrics. The former is easiest for EPA but requires significant knowledge (or training) on the part of the consumer as to the contents and organization of the data and what pre-processing is necessary for their analysis. The latter is easier to use, but more prone to misuse if the analyst would apply a different set of assumptions in processing the data.

12.4.2 Data Archiving, Distribution and Analysis Efforts.

EPA is addressing these issues with a variety of approaches emerging from a long range “Data Warehouse” OAQPS planning effort as well inter office collaboration with the Agency’s Office of Environmental Information (OEI). Several pilot projects to gauge the usefulness of new data products and access methods will be launched over the next two years. Included is the first "versioned" set of data from the monitoring network, a static snapshot of the EPA air quality data that occasionally is needed as the multitude of data points submitted to EPA each day create a moving target compromising referencability. EPA’s system was taken off-line for several days so that a “static” copy could be made available, at the request of a community of EPA research grant recipients.

An effort is underway to make all measured (versus reduced) data in AQS available on demand, allowing a customer to extract a data file based on their selection of geographic area, time frame, and pollutants of interest. A subsequent addition of the more timely AirNow data (including quality assurance caveats)would provide an exponential enhancement in data delivery.

Another goal is to make detailed air quality data summaries available to anyone at any time by offering a variety of self-service tools to access the data. Currently web pages exist allowing querying of annual summary information, and air quality professionals can access any data in the system. The relevant databases and tools are being upgraded to enable public availability of daily summary information through internet access. The timeliness of this information also will improve as processing time is reduced between data coming into EPA and availability made to the public and our external partners.

The linkage to OEI offers the longer range potential to merge multi media data sets benefitting for ecosystem assessment support. Most important is the need for EPA to broaden its outreach efforts beyond traditional clients (e.g., STAG recipients) to key consumer communities including academia, public health organizations and the private sector to ensure delivery of effective products and services.

Data analysis efforts are addressed in Section 11. Included in the funding strategy is the recommendation to shift $2.5M annually of funds that previously had been allocated for measurement collection into a focused data analysis efforts.

12.5 Policy Conflicts

The original network assessments aroused the policy community in addition to agencies that feared funding cuts associated with network thinning. Policy concerns were based on the historical use of monitoring sites representing explicit demographic boundaries (e.g., a county or MSA), which were perceived as potentially in conflict with the more extended spatial applications of data used in the assessment analyses. Some of these concerns are:

- undermining legally bound agreements based on the results of specific monitoring stations; and

- removing monitoring sites in designated nonattainment locations and substituting other information representative of that location.

Network assessments produce recommendations on removing or relocating samplers based largely on technical merit. In some instances, these recommendations may be in conflict with existing policy or other needs. For example, a recommendation that an ozone monitor be discontinued in a “nonattainment” county due to redundancy of neighboring sampling sites raises interesting policy/technical issues. Issues such as this need to be resolved following a credible technical recommendation of network realignment. It should not be assumed that policy should override a technical recommendation, nor should technical approach override existing policy. It should be possible to develop case-by-case solutions to these issues where needed.

On the other hand, it should be recognized that policy precedents in many ways constrict the value of air quality data. By assuming that a monitor’s prime objective is to represent a limited demographic boundary, then the actual spatial value of data is severely undermined as a veritable tool chest of spatial modeling applications which attempt to reflect natural processes are relegated to secondary status and not given the critical mass/interest to become commonplace in air quality planning. Clearly, many approaches within air program policy are out of balance

with natural systems, and a determined approach toward harmonizing air program analyses with natural systems is in order to extract the most value from environmental measurements. Also troubling is the delineated use of measurements and modeled predictions. Measurements are the current tool for strict regulatory applications, and models are used as a planning tool. The reality is that measurements really are just estimates of surrounding reality, and in one sense no different from a predictive output from a model. Both these tools need to be more effectively merged to support in unity a host of regulatory and planning applications.

These issues are indicative of a the need for better interaction between the policy/decision making and technical elements within air program operations, as well as across compartmentalized technical elements. The Strategy is only stating the issue by recognizing a lack of needed engagement between these communities.

12.6 Future Issues

It is fully expected that additional issues will develop as the Strategy is implemented. As such issues arise, EPA will engage in dialog with the appropriate entities (e.g., SLTs) and the appropriate staff (e.g., monitoring technical issues, funding issues, policy issues, etc.) so that the dialog is conducted with those individuals most knowledgeable with that specific topic. By engaging in such dialog in a timely manner, it is intended that potential implementation delays can be avoided or at least substantially reduced.